



# Volunteer Lake Assessment Program Individual Lake Reports

## SUNAPEE LAKE, LITTLE, NEW LONDON, NH

### MORPHOMETRIC DATA

Watershed Area (Ac.):	3,968	Max. Depth (m):	13.1	Flushing Rate (yr <sup>-1</sup> )	1.1
Surface Area (Ac.):	472	Mean Depth (m):	4.4	P Retention Coef:	0.66
Shore Length (m):	9,500	Volume (m <sup>3</sup> ):	8,449,500	Elevation (ft):	1220

### TROPHIC CLASSIFICATION

Year	Trophic class
1994	MESOTROPHIC
2008	OLIGOTROPHIC

### KNOWN EXOTIC SPECIES


The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at [www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm](http://www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm)

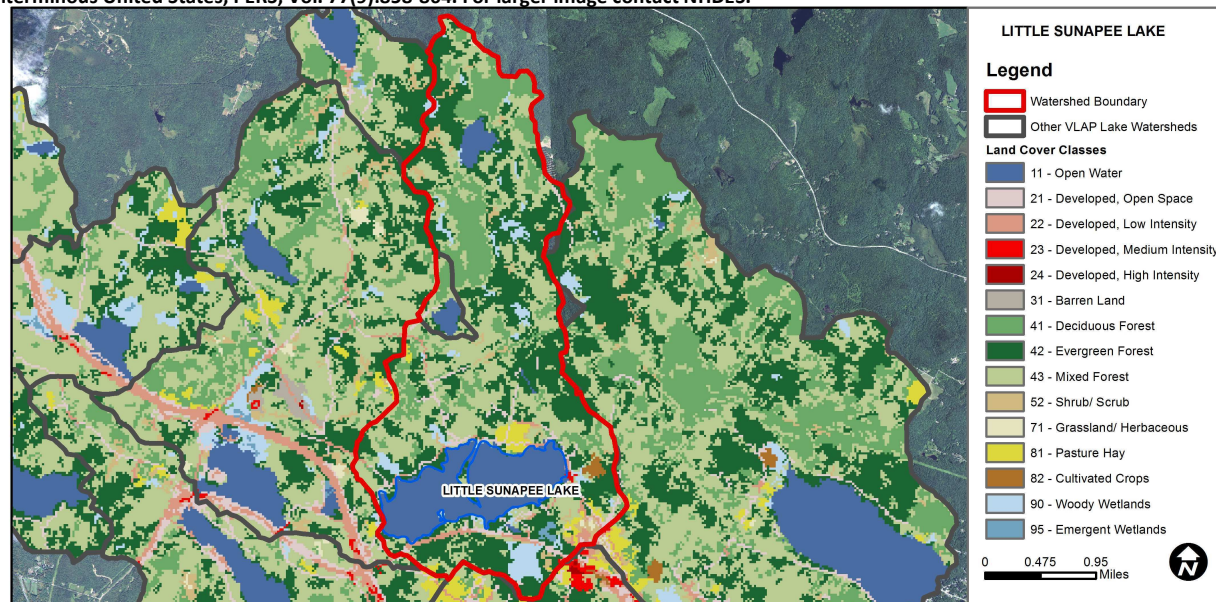
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Bad	There are >10% of samples (minimum of 2), exceeding criteria with one or more samples considered large exceedance.
	Dissolved oxygen saturation	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

### BEACH PRIMARY CONTACT ASSESSMENT STATUS

LITTLE SUNAPEE LAKE - BUCKLIN TOWN BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
LITTLE LAKE SUNAPEE - COLBY LODGE BEACH	Escherichia coli	No Data	No data for this parameter.

### WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	14.6	Barren Land	0	Grassland/Herbaceous	0.15
Developed-Open Space	2.93	Deciduous Forest	12.95	Pasture Hay	1.4
Developed-Low Intensity	1.5	Evergreen Forest	32.03	Cultivated Crops	0.36
Developed-Medium Intensity	0.1	Mixed Forest	27.97	Woody Wetlands	3.86
Developed-High Intensity	0	Shrub-Scrub	1.83	Emergent Wetlands	0.22



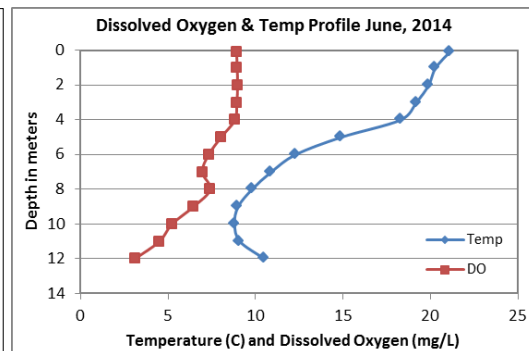
# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

## LITTLE LAKE SUNAPEE, NEW LONDON

### 2014 DATA SUMMARY

#### OBSERVATIONS AND RECOMMENDATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- **CHLOROPHYLL-A:** Chlorophyll levels increased from June to August and average chlorophyll levels increased slightly from 2013 but remained less than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Deep spot conductivity and chloride levels were slightly greater than the state medians however not above a level of concern. Historical trend analysis indicates highly variable epilimnetic conductivity since monitoring began.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer), Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) phosphorus levels remained stable and low from June to August. Average epilimnetic phosphorus level was much less than the state median and historical trend analysis indicates relatively stable epilimnetic phosphorus levels with moderate variability between years.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) decreased slightly from June to August potentially due to the increase in algal growth, however average transparency was better than the state median. Transparency measured with the viewscope (VS) improved (increased) from June to August and may be a better representation of actual conditions. Historical trend analysis indicates highly variable transparency since monitoring began.
- **TURBIDITY:** Epilimnetic, metalimnetic and hypolimnetic turbidities remained low on each sampling event.
- **pH:** Epilimnetic pH levels were within the desirable range 6.5-8.0 units however metalimnetic and hypolimnetic pH levels were less than the desirable range. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- **RECOMMENDED ACTIONS:** Continue to implement an enhanced conductivity and chloride monitoring program. Overall, chlorophyll-a and phosphorus levels have remained low, however transparency has become increasingly variable. This may be due to the increased frequency and intensity of storm events and resulting stormwater runoff and flushing of wetland systems. Encourage lake and watershed residents to implement stormwater projects on their properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource. Keep up the great work!



Station Name	Table 1. 2014 Average Water Quality Data for LITTLE SUNAPEE LAKE								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	4.85	3.80	17	80.6	6	3.94	4.49	0.69	6.77
Metalimnion				82.1	6			0.66	6.10
Hypolimnion				83.8	7			0.91	6.03

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**Conductivity:** 40.0 uS/cm

**Chloride:** 4 mg/L

**Total Phosphorus:** 12 ug/L

**Transparency:** 3.2 m

**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

**Chloride:** > 230 mg/L (chronic)

**E. coli:** > 88 cts/100 mL – public beach

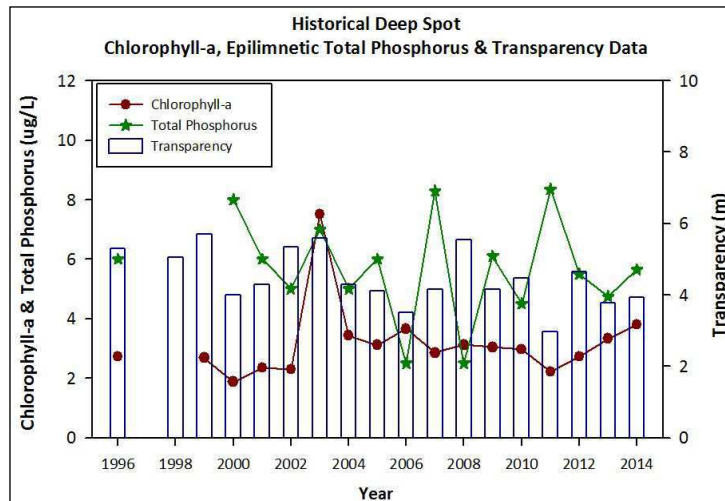
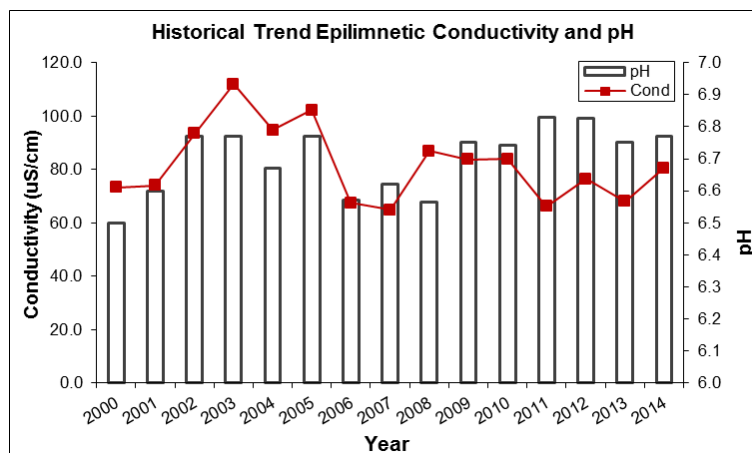
**E. coli:** > 406 cts/100 mL – surface waters

**Turbidity:** > 10 NTU above natural level

**pH:** between 6.5-8.0 (unless naturally occurring)

#### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.





## VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

### LAKE SUNAPEE, LITTLE SUNAPEE LAKE SUB-WATERSHED

#### 2014 DATA SUMMARY

##### OBSERVATIONS AND RECOMMENDATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- ◆ **CONDUCTIVITY/CHLORIDE:** Conductivity was stable and low at Stn. 1410.5 and was much less than the state median. Conductivity was slightly elevated and greater than the state median at Stn. 1420. Conductivity was elevated and much greater than the state median at Stns. 1415 and 1418. These stations receive runoff and roadways and a salt storage facility. Management efforts are currently underway to reduce conductivity at these stations.
- ◆ **TOTAL PHOSPHORUS:** Phosphorus levels at Stn. 1410.5 were average except for the June sampling event, when phosphorus levels spiked. Laboratory checklists note colored water and light sediment in the sample which could have contributed to the phosphorus level. Phosphorus levels at Stn. 1415 were average from May to July, and were also average in May and June at Stn. 1418. Phosphorus increased to slightly elevated levels at both stations from August through October and moderate amounts of organic matter was noted in most samples. Phosphorus levels were stable and low at Stn. 1420.
- ◆ **TURBIDITY:** Turbidity was low to average at Stns. 1410.5 and 1420. Turbidity at Stn. 1415 was slightly elevated in June and July, increased to elevated levels in August and September, and then decreased slightly in October. Water was generally colored with light to moderate sediment and organic matter noted by the laboratory during those months. Turbidity at Stn. 1418 was elevated in June, September and October with similar water conditions noted as Stn. 1415.
- ◆ **pH:** pH levels at Stns. 1410.5, 1418 and 1420 generally fluctuated below the desirable range 6.5-8.0 units. pH levels at Stn. 1415 were generally within the desirable range.
- ◆ **RECOMMENDED ACTIONS:** Conductivity levels at Stns. 1415 and 1418 are being monitored and addressed as mentioned above; keep up the great work! Water conditions were often noted as being brown with sediment and organic matter suggesting that potential wetland influences and/or streams with high organic content and leaching of tannic and humic acids causing fluctuations in phosphorus, pH and turbidity levels.

Table 1. 2014 Average Water Quality Data for Little Lake Sunapee Sub-Watershed

Sub-Watershed Name	Station Name	Cond.	Total P	Turb.	pH
		uS/cm	ug/l	ntu	
Kidder Brook Upstream	1410.5	19.9	12	0.94	6.32
Bucklin Beach Brook	1415	362.9	17	3.57	6.57
Murray Pond Outlet	1418	307.3	20	2.64	5.89
Little Lake Sunapee Outlet	1420	83.5	6	1.27	6.41

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**Conductivity:** 40.0 uS/cm

**Chloride:** 4 mg/L

**Total Phosphorus:** 12 ug/L

**Transparency:** 3.2 m

**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

**Chloride:** > 230 mg/L (chronic)

**E. coli:** > 88 cts/100 mL – public beach

**E. coli:** > 406 cts/100 mL – surface waters

**Turbidity:** > 10 NTU above natural level

**pH:** between 6.5-8.0 (unless naturally occurring)